

servations, pp. 468-474, will see that these co-ordinated values form a curve instead of a straight line."

I felt much surprise at reading this statement, because if the observations agree with the central cubic (2), they must agree with any transformation of equation (2).

I now give the values of $\frac{n}{f}$ and $n t$ and diagrams, comparing them with equation (3), an inspection of which will show that Mr. Nipher is in error in saying "that these co-ordinated values form a curve instead of a straight line." Anyone accustomed to such observations will see that they do *not* form a curve, but deviate *irregularly* as all observations do, above and below the "straight line," which is the true "curve" that represents them.

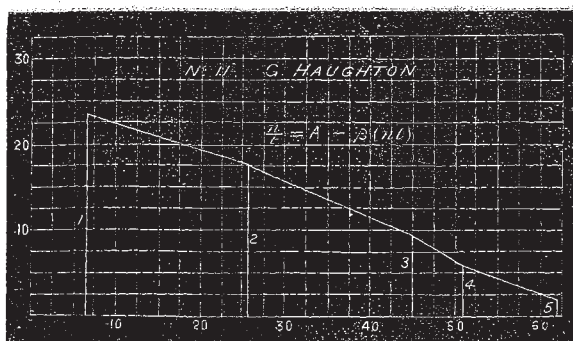
No. 1.—*Dr. Macalister's Experiments* ("Animal Mechanics," p. 468).

No.	$n t$	$\frac{n}{f}$
1	23.40	55.4
2	29.25	52.1
3	60.18	43.2
4	72.38	36.9
5	106.00	26.5
6	126.38	15.6
7	139.10	10.2
8	139.97	5.4

The accompanying diagram (No. 1) shows these values plotted, and the right line which represents them all except No. 8, which falls too much below the line.

No. 2.—*Mr. Gilbert Haughton's Experiments* (p. 474).

No.	$n t$	$\frac{n}{f}$
1	6.89	24.5
2	25.58	18.1
3	44.94	9.8
4	51.00	5.7
5	61.20	1.7



The accompanying diagram (No. 2) shows that these observations also may fairly be represented by a straight line.

Trinity College, Dublin, SAMUEL HAUGHTON
March 13

(To be continued.)

The "Wolf" in the Violoncello

As the question asked by Mr. Fryer in your issue of the 25th of March (p. 406) remains unanswered, allow me to suggest what has been brought prominently before me in some recent experiments.

The "wolf" of which he speaks occurs in all instruments of the violin family, and not only in the violoncello; indeed, it is present even in fine specimens by the great masters. It is perfectly true that it depends on the resonant case of the instrument itself, as can easily be shown in the way he suggests; a "false string" is soon detected and remedied by any player.

No doubt it indicates that the consonating box has the power of reinforcing certain vibrations, but not others; and even of stifling some by interference. Curious facts on this topic have recently been brought before a foreign scientific society, which show that the acquired power of consonance depends on a molecular change in the material of which the instrument is made, that it can be increased by steady and good playing, that it is to be detected even in brass instruments like the trumpet. It has long been known that a violin deteriorates in the hands of a bad performer. But there is an obvious cause of weakness in all fiddles which seems to me to have hardly attracted sufficient attention; I mean the two "sound-holes" in the belly. These f-shaped apertures, which are doubtless needful to allow escape of aerial vibrations, cut the grain of the wood completely across in a most important part. Every connoisseur pays particular attention to the straightness and regularity of grain; indeed, blocks of wood well matched in this respect, from which two similar sides might be cut, have been handed down in workshops as of inestimable value. Wheatstone's well-known experiment of the Telephonic Concert proves how perfectly musical tones can be conveyed along the fibres of pine-wood to a considerable distance. These considerations led me recently to submit the point to the test of trial. What I have elsewhere termed "elliptical tension bars" are simply four longitudinal struts of light pine glued to the back of the belly, intercepting the sound-holes. They have the effect of removing the "wolf"; sometimes entirely, nearly always to a marked extent. No doubt they also act by strengthening the fabric exactly in the line in which the string pulls. The pull, which is considerable even in a state of rest, increases enormously when it is moved slightly out of its position of quiescence, for well-known mechanical reasons; and hence, besides the removal of the "wolf," there is gained by means of the bars a decided increase of power and tone.

The "elliptical" form was adopted because it is found to give considerable resistance with small amounts of material. Anything which rendered the belly of the fiddle heavy would perform the function of the "mute" as now commonly applied to the bridge, but which can be, and often is, replaced by a penny or a half-crown wedged between the strings below the said bridge. The great rigidity and low specific gravity of dry pine-wood meet the two requirements: the whole mass added does not exceed twenty or thirty grains.

Musicians are slow to adopt theoretical improvements, and dealers in violins cannot be expected to favour anything which puts a one and ninepenny fiddle more nearly on a level with a Stradivarius than it was; but I am honestly of opinion that the system is of value. I must, however, protest against its being prejudiced by the unsuccess of imitators or of previous efforts. Something of the sort has often been tried before, and it was only after long and laborious experiment that this particular attempt gave good results. By these, and in due time, I am content to let it be judged.

14, Dean's Yard

W. H. STONE

Flowering of the Hazel

THE question whether the male and female flowers of the hazel mature simultaneously on the same bush has been already discussed in your columns (NATURE, vol. i. p. 583, vol. iii. pp. 347, 509). A repetition of the observations this spring has enabled me to confirm my previous statement that this is the case, at all events very frequently; in fact, almost invariably in all the cases that have come under my notice. As this is in direct opposition to the statements of several of your correspondents, especially one resident in Kentucky, who affirms that the hazel, though apparently monoecious, is practically dioecious, it would be interesting if we had further information as to the circumstances under which these varying conditions occur. On the present occasion the male and female flowers were found in close contiguity and both in a mature condition at the close of a remarkably protracted cold and dry season, at an unusually late period, the last week in March.

ALFRED W. BENNETT

A Flint Celt

ON Tue-day last, the 6th inst., I found on the west shore of this bay a very fine specimen of a flint celt, quite perfect. The cliff in the immediate vicinity is composed of fluviatile clays, capped with a thin bed of Bembridge limestone, in a very broken state: the vegetable soil resting on the latter is only from five to ten inches deep. Perhaps it may interest some of your readers if you do me the favour to notice this. It is rather remarkable

that the spot on which the celt was found should be within thirty yards of the site of a Roman building discovered by me in 1864.
Gurnet Bay, April 9 E. J. A'COURT SMITH

Arctic Temperatures

IN your article on the Austrian Polar Expedition (vol. xi. p. 397), it is stated that in January "the warm S. and S.W. winds always brought great masses of snow, and produced a rise in the temperature amounting to 30°–35° R. in a few hours." 32 R. = 72 F.

Such enormous fluctuations of temperature are unparalleled in any other part of the world, and it seems quite impossible that they can be due to any drift of warm air. I would suggest that they are probably caused by the wind tearing up the frozen surface of the sea, and liberating the heat of the unfrozen water below. Dr. Kane, when wintering in Smith Sound, once met with such a rise of temperature, and he says that open water was near. This explanation of the phenomenon is supported by the fact you mention in the same article, page 398, that in the summer the temperature was remarkably constant. The same cause could not act during summer, for the air is not then much colder than the unfrozen water.

There is no doubt of the power of a storm of wind to tear up a very thick sheet of ice.

JOSEPH JOHN MURPHY

Old Forge, Dunmurry, Co. Antrim, March 30

AÉRONAUTICS

M. GASTON TISSANDIER has just finished the analysis of carbonic acid contained in the air collected during his recent ascent (vol. xi. p. 429). He found at Paris 37 cubic centimetres per 100,000; at a height of 2,700 feet, 27; and at a level of 3,300 feet, 30. The difference of altitude between the two aerial stations being too small to justify drawing any conclusions he will shortly make another ascent with the same balloon to an altitude of 24,000 feet.

M. Godard made an ascent in the balloon *Saturn*, from Bayonne, on March 29, at half-past five, and was drifted over the Pyrenees. The trip was difficult, as the balloon was loaded with snow and hail, and all the ballast was thrown over in order to keep the balloon afloat. The cold was intense, and the wind very strong. The landing took place at Azul Mayor, a small country town east of Pampeluna, at half-past seven, the distance run being 120 kilometres. The grapnel having been broken, the aéronaut and the three passengers were severely hurt. This is the first time that any balloon has crossed the Pyrenees. The *Saturn* followed the French valley of the Nive and the Spanish valley of Baztan on the southern side. An interesting observation was made when crossing the culminating point of the pass. The Larratéce Neguya was surrounded by cirro-cumulus, which resisted the force of the wind and seemed an obstruction in the way of aéronauts, who found it necessary to throw out a certain quantity of ballast, and to reach an altitude of 6,600 feet, in order to cross that sea of motionless clouds. A strong hissing noise was heard when travelling over them; whether it was produced by the friction of the air on the peaks or on the masses of electrified vapours, can only be decided by another experiment conducted scientifically.

On April 4 two ascents were made almost simultaneously. M. Triquet ascended from the Place du Trône, Paris, and landed at Montreuil, 20 kilometers from his starting-point, forty minutes afterwards, having run in an E.S.E. direction. M. Duruof ascended from Cahors, in the Lot, and landed at Catres, in the same department, having run 22 kilometers in sixty-five minutes, but in a N.N.W. direction. Both balloons having ascended at the same moment, moved at right angles.

I have reason to believe that a number of ascents will

be made simultaneously from La Villette gasworks, and the several tracks compared with each other. Some interesting facts may be elicited by these comparative trips.
W. DE FONVIELLE

ARCTIC GEOLOGY*

II.

Cryolite of West Greenland Coast.—At Evigtok (*ivik*, Eng. grass), twelve miles from Arksut (Eng. leeward), in 61° 13' lat. and 48° 9' W. long., the mountains rise to a height of more than 2,000 feet, enclosing a sort of basin, with an area of more than a square mile, the bottom of which is covered with grass and *Salix arctica*, four feet in height, and other plants. This is much frequented in summer by the Greenlanders, who catch large numbers of capelins and cod, which frequent the coast in shoals, as well as the *Salmo arcturus*, Linn. (the *Lodde* of the Norwegians). Weights used in this fishery, taken by Danish missionaries to Copenhagen at the beginning of the century, were found to be composed of cryolite, which led to the discovery of two veins of that mineral in the gneiss at the head of the bay, which has since been worked by Mr. Tayler, F.G.S. The white cryolite bed is about eighty feet in width, dipping south with the planes of the gneiss in which it occurs. Near its higher portion there is a large quantity of galena, worked in 1854, which gave 82½ per cent. of argentiferous lead, containing forty-five ounces of silver to the ton of ore. Fifteen feet from the surface the cryolite was of a dark colour, so that it is probable that the black cryolite in the higher vein is merely less decomposed, and not bleached. The Greenlanders value the white variety most, which they call *orsoksiksæt* (*orsok*, blubber), from its soft greasy appearance and feel; they gradually pound tobacco leaves placed between two pieces of it, the resultant powder consisting of half of cryolite dust, which they consider superior to any European snuff.†

Large quantities of cryolite are now imported to Copenhagen, the mines being worked by Messrs. Thomsen, of that city. Mr. Qualye reports that pieces of gneiss and trap are found imbedded in the cryolite, and states that the mines are filled with snow and ice during the winter, work being carried on by fifty men from May to October; 5,000 tons are raised yearly. Cryolite, except at Miask, in Siberia, does not occur out of Greenland.

Cryolite is a fluoride of sodium and aluminium, and is composed, according to Mr. Evan T. Ellis, of—

13	per cent. of aluminium,
34	" " sodium,
53	" " fluorine.

In Denmark, it is largely used in the manufacture of soda, which is procured by mixing it with lime and applying heat, 100 tons of cryolite yielding forty-four of caustic soda. It was introduced into Philadelphia by the Pennsylvania Salt Company, who imported 8,000 tons in 1867. By mixture with silica a very beautiful glass is produced, capable of being moulded. Cryolite was used by Deville as a flux in the manufacture of aluminium, the process of extracting aluminium from it was first used by Mr. Dick in 1856, but its use has since been abandoned in favour of bauxite. The fluoride of calcium is sent to Paris to be used in glass etching.

Associated with the Greenland cryolite brought over

* Continued from p. 449.

† Giesecke, *Edin. Phil. Jour.* vol. vi. 1822; J. W. Tayler, *Quar. Jour. Geol. Soc.*, 1856; *Chemical News*, 1868, p. 8, &c.; *Proceedings Amer. Pharm. Soc.*, 1868. See Rink's Memoir on Greenland, published by the Royal Danish Academy of Sciences, 1853, p. 71; L. Jacobsen's "Et Aar i Grønland, 1862"; and Lieut. Bluhme, in the Danish magazine *Fra alle Lande*, vol. i.